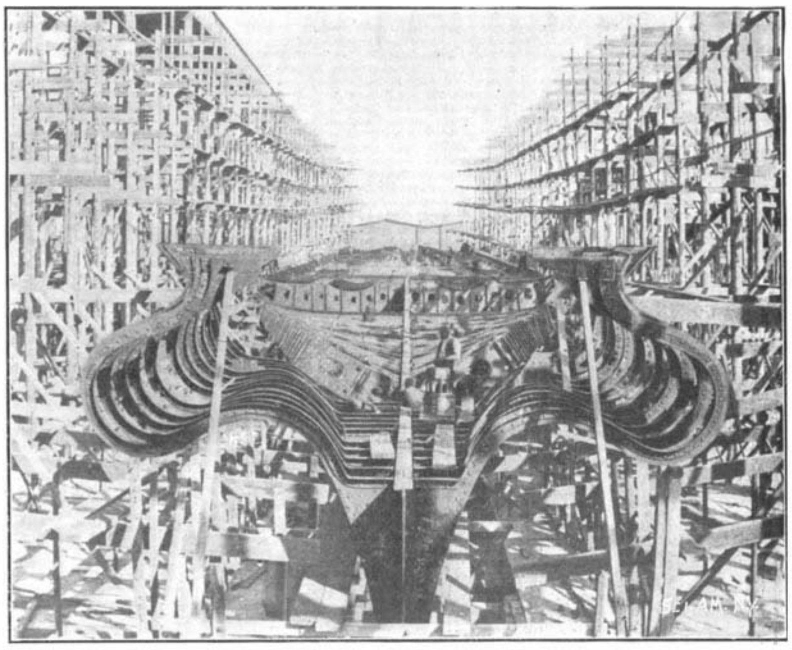
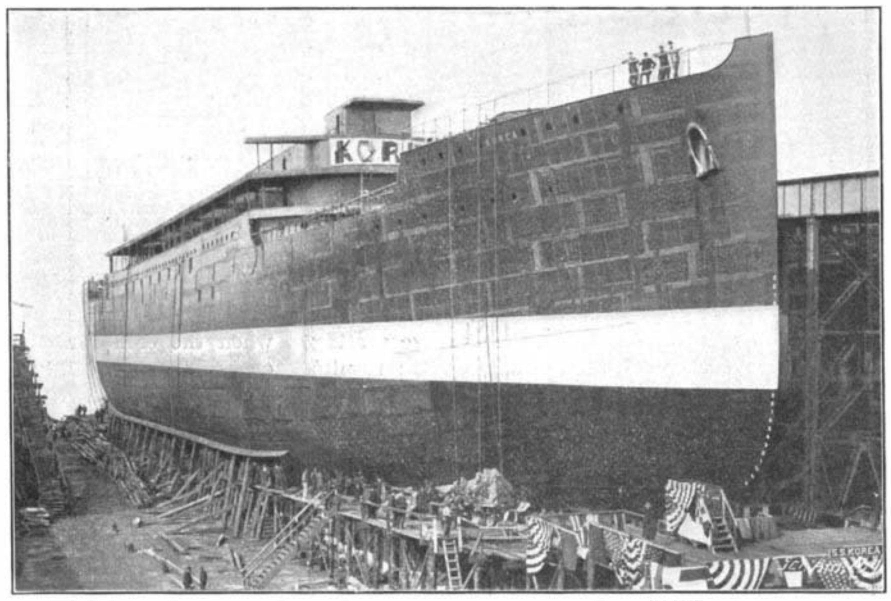
LAUNCH OF THE PACIFIC MAIL LINER "KOREA."

The handsome passenger and freight liner "Korea" which is the largest steamship ever built in America, was successfully launched at the works of the Newport News Shipbuilding and Dry Dock Company, Newport News, Va., Saturday, March 23. The "Korea" will ply between San Francisco and Hong Kong, stopping at the ports of Honolulu, Yokohama, and Nagasaki. Besides her great freight capacity, she will have accommodations for 300 first-class passengers, 30 steerage, and 1,200 Chinese. The Chinese quarters are so fitted that the space may be used for cargo if unoccupied by Chinese. The cost of the "Korea" is $2,000,000, and her contract speed is 18 knots.



STERN VIEW, SHOWING SPECTACLE FRAMING FOR PROPELLER SHAFTING.



Length over all, 572 feet 4 inches. Beam, 63 feet. Depth to upper deck, 40 feet. Displacement, 18,600 tons. Horse power, 18,000. Speed, 18 knots.

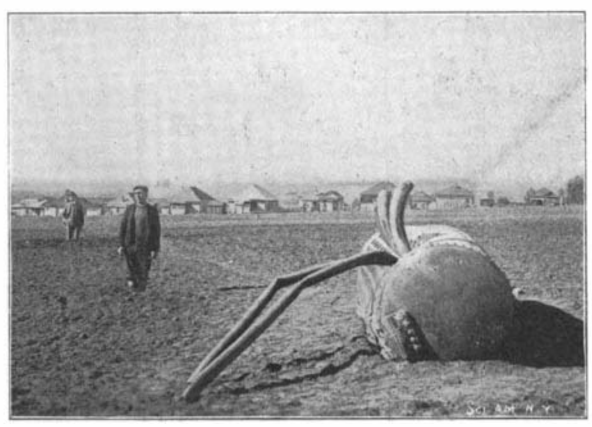
LAUNCH OF THE PACIFIC MAIL LINER "KOREA," AT NEWPORT NEWS.

(The largest ship built in the United States.)

The principal dimensions of the vessels are as follows: Length over all, 572 feet 4 inches; length between perpendiculars, 550 feet; beam, 63 feet; depth, 40 feet to upper deck; draft, 27 feet; displacement, 18,600 tons. The hull is of steel, with frames spaced 32 inches throughout. The double bottom runs the entire length of the ship and extends to the turn of the bilge. The decks, in their order, are called the orlop, lower, main, upper, promenade, and boat. The lower, main, and upper decks extend the full length of the ship, while the promenade is on a level with the forecastle and poop.

The vessel is fitted with two sets of quadruple-expansion, four-cylinder, vertical inverted engines, with cylinders 35, 50, 70, and 100 inches in diameter and 66 inches stroke. They are designed to develop 9,000 indicated horse power each, at 86 revolutions per minute. The order of the cylinders from forward is high pressure, low pressure, second intermediate, and first intermediate. The engine framing consists of cast-steel housings of I section, bolted to the cylinders and bed-plate, four to each cylinder. The crosshead guides are of cast iron and bolted to the housings. The bed-plates are also of cast steel of I section. Piston valves are used on all cylinders. The piston rods, connecting-rods, valve stems, eccentric rods, and shafting are of forged steel. The crosshead slippers are of cast iron, lined with Parsons' white metal, which is used for all bearing surfaces throughout the engines. The pistons are cast steel, dished. The crank shaft is made in four interchangeable parts, and is 19½ inches in diameter, with a 6-inch hole. Two of the eccentrics, which are of cast iron, are fitted over couplings, while the others are keyed to the shaft. The reversing engine is of the steam and hydraulic type, with steam cylinder 9 inches in diameter, oil cylinder 5 inches in diameter, and a stroke of 20 inches. The thrust bearings are of the horseshoe type, with fourteen collars each. The propeller shaft is fitted with composition sleeves where it works in the stern bearings of lignum-vitæ. The propellers are three-bladed, 19 feet in diameter by 25 feet pitch. The blades are of manganese bronze, and the hub is of cast steel. The main condensers are cylindrical, 7 feet 2½ inches in diameter and 15 feet long between tube-sheets, with a combined cooling surface of 11,787 square feet. Each condenser will have an independent air pump and two circulating pumps. There will also be two auxiliary condensers with combined air and circulating pumps.

Steam is furnished by six double-ended and two single-ended Scotch boilers, 16 feet in diameter and 20 feet 3 inches and 10 feet 5¼ inches long, respectively, working at a pressure of 200 pounds. They are placed in two watertight compartments. The double-ended boilers have eight furnaces, and the single-ended four. Their total heating surface is 44,912 square feet, and grate surface 1,072 square feet. Forced draft is furnished by thirteen blowers. There is also a donkey boiler on the upper deck, of the cylindrical, upright type.



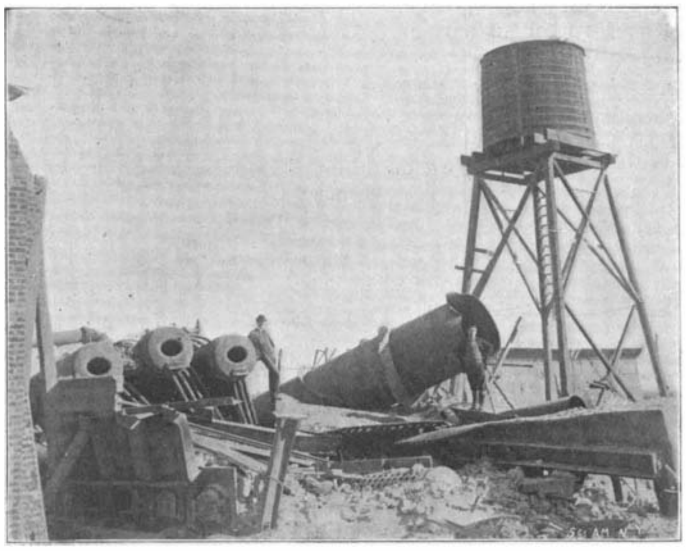
DOME THROWN 1,768 FEET FROM BOILER SETTING

The particulars of the launching ways are as follows: Length of ways, 690 feet; width of ways, 4 feet; distance between ground ways, 23 feet; grade of ways, ⅝ inch to 1 foot; grade of keel, ½ inch to 1 foot. The launching weight of the vessel was 7,000 tons. The pressure per square foot on the ways was two tons.

The "Siberia," which is a sister ship to the "Korea," will be launched in about two months.

AN INTERESTING BOILER EXPLOSION.

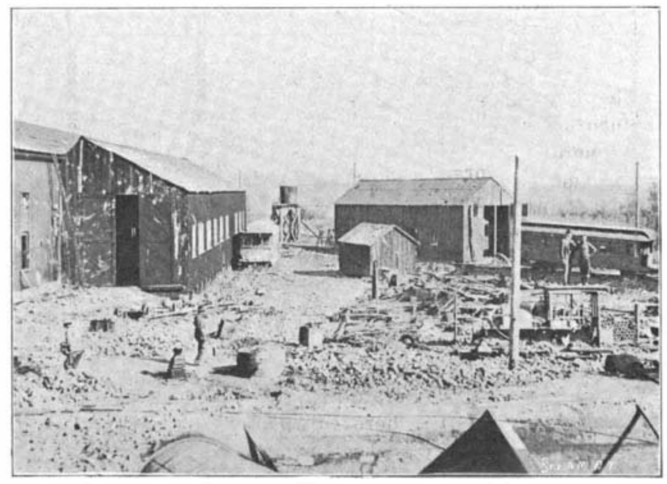
Our engravings represent an interesting boiler explosion which occurred at Sherman, a small place between Los Angeles and Santa Monica, Cal., on the Pasadena and Pacific Electric Railway Company's lines and in the power plant of the company. The accident occurred on the 5th of December, 1900.



VIEW OF PART OF WRECKED PLANT SHOWING DRUMS.

The boiler was of the water-tube type, made by the Stirling Company, being one of a battery in the plant of the railway company at Sherman. This was the second, and by far the worst, explosion of this type of boiler in the plant within three months. This special battery was of 2,500 horse power, and the boiler which exploded had been in use five years. The explosion occurred at 2:45 A. M.; the shock was felt over a wide area, and was distinctly heard at Los Angeles, ten miles away. Our engravings give an idea of the widespread destruction caused by the explosion. Walls of solid brick 40 feet long and 2 feet thick were converted into débris, and piles of wreckage were to be seen everywhere. Corrugated roofing was blown away, and three steel drums, each 16 feet long and 3 feet in diameter, were lifted bodily and hurled to far-distant points. The power house rests on the side of the foothills, which at this point have a rise of 150 to 200 feet to the mile. Two of the drums seem to have taken a general course up this incline toward the mountain. One passed over two rows of cottages, and just missing one, landed on and demolished a shed and outbuildings, landing just 556 feet in an air-line from the starting point; while another, taking the same course, passed over two more rows of cottages, depositing water tubes, etc., along its route, and throwing them through roofs and side walls of the dwellings along its course. It landed 1,768 feet from its original site. The power plant was, of course, tied up by the explosion, and power had to be obtained from other sources. The boiler which exploded in December was not the same one which exploded several months earlier. That one was being repaired, and had not yet been put into use; it was a newer boiler than the others. After the first explosion, and at the request of the railway company, the superintendent of the works in which the boiler was built went to Los Angeles for the purpose of ascertaining, if possible, the cause of the explosion. He made a close examination of the other boilers, and pronounced them in good condition. There was, therefore, no reason to suspect that there was any defect in any part of their battery.

Reports have been made on the accident, which occurred on September 10, 1900, in which the middle drum of one of the boilers was ruptured. It was found that the pressure carried was from 170 to 175 pounds, while the boilers were not designed for a working pressure of more than 150 pounds. This necessitated the screwing down of the safety valves to such an extent as to entirely destroy their efficiency; in fact, after having been screwed down to 175 pounds all the elasticity of the springs was gone. The mud drums were bricked in solidly, thus depriving them of freedom of movement to allow for expansion and contraction. The standard method of introducing feed-water into the rear upper drum was abandoned, and in its place a series of pipes or nozzles was placed in the mud drum, no means, however, being



DAMAGE DONE BY BOILER EXPLOSION, SHOWING LOCOMOTIVE WHICH WAS COMPLETELY STRIPPED.

provided for removing any deposit that accumulated in these pipes or nozzles. The low-water alarm whistles were found to have been gagged so that, no matter how low the water became, the whistles could not sound. The arrangement of the steam main was also faulty, as it kept up a continual vibration. Possibly the explosion of the boiler in December was due to one of these causes.

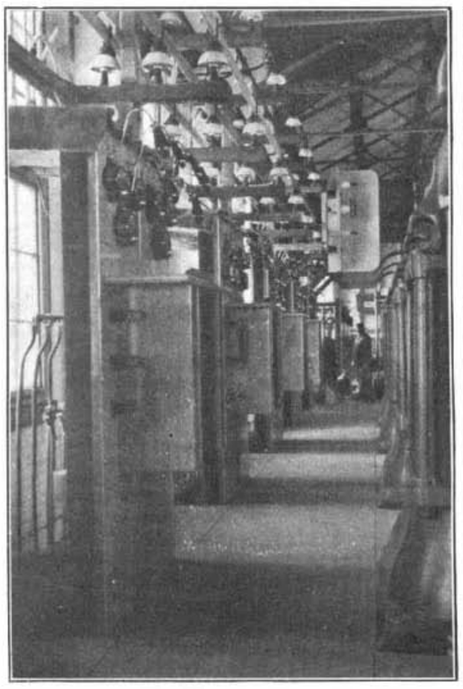
RECENT DEVELOPMENTS AT THE NIAGARA FALLS POWER PLANT.

BY ARTHUR B. WEEKS.

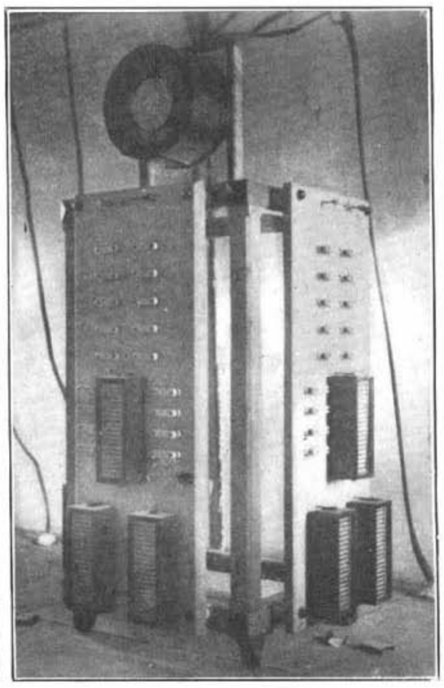
Perhaps the most interesting of late improvements at the great power plant on the upper Niagara is the completed aluminium transmission line to Buffalo, by means of which electric current will be sent to the Pan-American Exposition for all the manifold purposes for which electricity will be brought into use. Not the least noteworthy, also, are the changes in the lightning arrester apparatus, together with the installation of circuit-breakers on the 22 kilo-volt line.

These lightning arresters (Fig. 2) are made by the Westinghouse Electric and Manufacturing Company. The spark gaps for each of the three lines are on marble slabs, upon three sides of a wooden frame set on rollers. Thus, in case of total disability, the lightning arrester may be rolled out and another substituted for it.

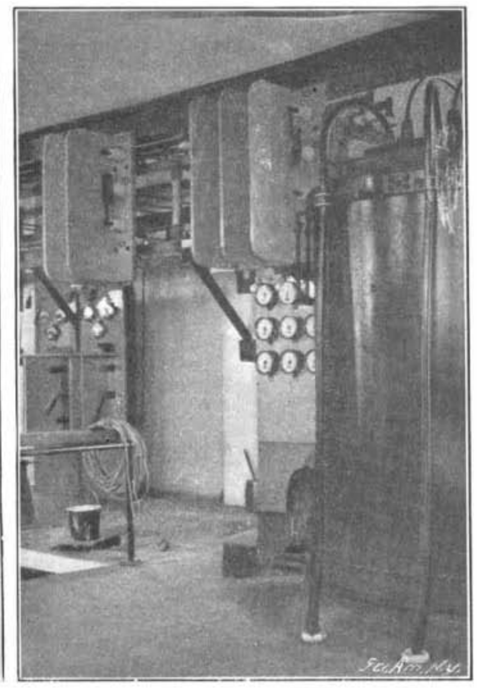
A three-phase General Electric electrostatic ground detector surmounts each lightning arrester frame. At the top of each marble slab is an auxiliary air gap, set according to the line voltage. For 25,000 volts, the gap is one-fourth inch; for 23,000 volts, one-eighth inch; while for 21,000 volts there is no gap. Below this auxiliary air gap are other gaps and resistances, and the ground connection beneath from the last panel connection. The frame is of thoroughly-dried wood, while glass or porcelain is recommended for the upper end.



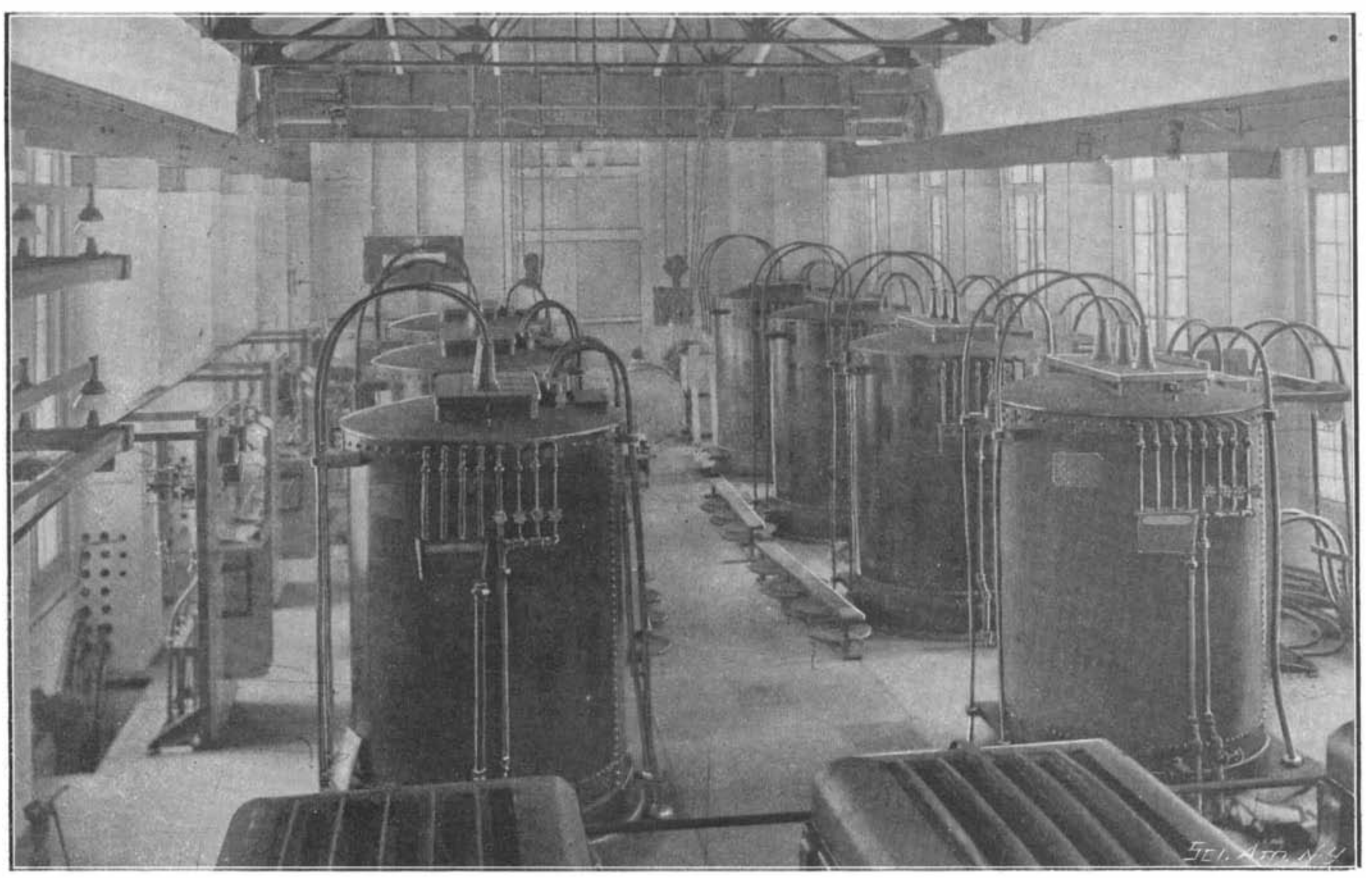
1.—High Potential Panels for Transformers.



2.—Lightning Arresters.



3.—Terminus of High Potential Bus-Bars, and Double-Throw Switches.



4.—Step-Up Transformers, 2,500 Horse Power Each, for Union Carbide Company.

RECENT DEVELOPMENTS AT THE NIAGARA FALLS POWER PLANT.

Several feet above these panels are the choke coils, also on wooden frames, and with six coils in series with each leg of the three-phase lines. The coils are wound spirally about a wooden core, with no metal parts to cause induced current and lower the choking effect of the coils. Each has five layers of soft, flat copper under one insulation of paper and cotton tape, with seventeen to nineteen complete layers. The choke coils are thoroughly soaked in insulating varnish and baked, and finally painted black. Where choke coils are used as in this case, they must be connected in circuit between the apparatus to be protected and the arrester. In the same room are located the circuit-breakers, as well as the converters for the ammeters, which are in a panel in the transformer room. The circuit-breakers are high upon the wall, having a long drop lever to rupture the arc. The floors of the transformer and lightning arrester rooms are of cement. The high potential switches are operated by means of a long hardwood pole, having a hook in the end to engage in an eye near the end of the switch blade.

The high potential marble panels in the foreground on the left of Fig. 1 receive the wires from the transformers. The converters for the high potential switchboard ammeters are back of the panels seen in Fig. 1. The switches are double throw. The bus-bar porcelain insulators are thoroughly tested for 60,000 volts.

Illustration No. 3 shows the terminus of the high potential bus-bars and two sets of bus-bar double-throw switches. Illustration No. 4 gives a complete view of the Westinghouse transformers for the Union Carbide transmission lines. Upon the floor is shown a group of choke coils with their framework, ready for mounting. The bus-bars for the transmission line are insulated with three layers of tape and two additional layers at the clamps, after being coated with insulating varnish and dried. This is then coated with liquid glass and soapstone, and afterward painted black. The framework is very neatly made, and substantial. The bus-bar switches are double-throw, and when either side is cut out, the switch-blade is closed upon the center connection to prevent accidental closing. The thick marble slabs effectually prevent arcing from blade to blade. The full capacity of the bus-bars, when complete, will be 25,000 horse power. The twenty General Electric air-blast transformers of 1,250 horse power each are all in place. The high potential switches are double throw; thus a line may be changed at will at either bus-bar.

The General Electric induction motors of eight horse power each, which have given excellent service in driving the blowers to cool the transformers, must, owing to lack of space and the demand for increased air supply, make way for two others of the same make, of twenty-five horse power each. All the wiring is done in the most approved manner, and is tested with 50,000 volts. The insulators in the air chamber are thoroughly secured by screws or bolts to the iron framework of the place. Exceptional care should always be taken in installing wires and bus-bars for high-tension circuits. They should be out of reach, when possible, to avoid mechanical injury. To accomplish this, they are universally placed ten to twenty feet above the floor, and leave the power house at the highest possible point. They should be in plain view, and rigidly supported on porcelain insulators. These bus-bars as shown are supported upon insulators of special design. In the air-chamber, where the high-tension cables from the transformers and from the high-tension panels cross each other, the crossing is effected in the most approved manner, special means being frequently necessitated.

Porcelain tubes are placed over each cable at the insulators, where iron brackets are in use. The cables are also run through porcelain tubes in the cemented floor, where they are brought up to the high-tension marble panels. With the introduction of the circuit-breakers on the high potential side, the time element circuit-breakers and fuses on the low potential side will be discontinued, and the panels remodeled. If, for any reason, the high potential circuit-breakers in the lightning arrester room do not act under short circuit, the emergency switch upon the switchboard will be depended upon to open the dynamo field circuit-breakers. It is, however, hardly possible that recourse will have to be made to the emergency switch.

The new step-up transformers for the Union Carbide Company, shown in illustration No. 4, are of Westinghouse make, oil insulated and water cooled. Each is of 2,500-horse power capacity, being twice as large as any others previously made. The cables from the power-house switchboards are first connected to the low-tension panels at the right of the transformer room, and, after proper connections to the switches and circuit-breakers, pass directly to the transformers, which take on their low-tension sides 2,300 volts two-phase, and deliver on their high-tension sides 11,000 volts three-phase. The cables are then connected to the high-tension panels at the left, from which they are carried in a subway to the works of the Union Carbide Company, a mile distant. Triplex lead-sheathed cables are used on these three transmission lines in the subway.

Raising Hungarian Grapes.

An experiment in raising Hungarian grapes is to be made near Norfolk, Va. Barth S. Lindsay of Norfolk, Va., is the projector of this experiment. He will at first plant three acres in these vines, and if, after three years, the experiment proves a success, he will establish a larger vineyard. Mr. Lindsay, who has had experience as a vine-dresser in Hungary, considers the climate and soil of this section favorable to the growth of these grapes.